1: Int Arch Allergy Immunol 1997 May-Jul;113(1-3):109-13 Related Articles, Links

Entrez PubMed
PubMed Services
Related Resources

X-ray crystal structures of birch pollen profilin and Phl p 2.

Fedorov AA, Ball T, Valenta R, Almo SC.

Department of Biochemistry, Albert Einstein College of Medicine, Bronx, N.Y. 10461, USA.

BACKGROUND: Type 1 allergy affects 20% of industrialized populations and thus represents a major health care issue. The symptoms of type 1 allergy, which include rhinitis, conjunctivitis, dermatitis and asthma, are elicited by the cross-linking of IgE receptors through polyvalent allergens. A detailed understanding of the cell surface phenomena and the rational development of new therapies require high-resolution structural information. METHODS: The structures of two widespread allergens, birch pollen profilin (BPP) and Phl p 2 have been solved by multiple isomorphous replacement. Refinements are underway to 2.4 and 2.0 A, respectively. In addition, the IgE-reactive epitopes of BPP where identified by screening an epitope expression library with the serum IgE of an allergic individual. RESULTS: BPP exhibits an alpha/beta-fold which is similar to the mammalian and amoeba profilins. The structure of Phl p 2 is a compact eight-stranded beta-barrel. Screening an epitope library of BPP identified three major epitopic regions involved in IgE binding, including the amino and carboxy-terminal alpha-helices. These regions also interact with the physiologically relevant ligands of profilin, actin and proline-rich peptides. CONCLUSIONS: The distribution of IgE-binding sites on BPP allows for the productive interaction with IgE antibodies of different epitope specificities required for efficient signal transduction. These epitopes correspond to the most highly conserved regions of the profilin molecule and thus provide the molecular basis for allergen cross-sensitivity. Due to steric considerations, the involvement of these epitopic regions in the binding of physiologically relevant profilin ligands indicates that the native profilin is the species responsible for eliciting the allergic response. A comparison of the BPP and Phl p 2 structures shows that there is no preference for secondary structural elements in the allergic response. The detailed chemical and physical description of the major reactive epitopes provides a data base for the design of tight-binding monovalent ligands which can prevent receptor aggregation and thereby reduce the allergic response.

PMID: 9130496 [PubMed - indexed for MEDLINE]